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Economic Research Aid

INDEX OF PRODUCERS EQUIPMENT
FOR THE USSR
1955-61 AND 1965



CIA/RR A.ERA 61-9

December 1961

CENTRAL INTELLIGENCE AGENCY

Office of Research and Reports

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3

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MEMORANDUM FOR: Recipients of CIA/RR A.ERA 61-9, Index of Producers
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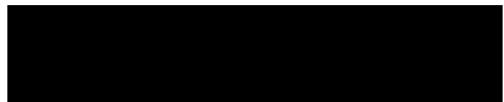
SUBJECT : Correction of CIA/RR A.ERA 61-9

Page 16, paragraph 1: for (from Table 5, p. 15, above) read
(from Table 5, p. 21, below).

Page 16, paragraph 2: for (from Table 3, p. 12, above) read
(from Table 3, p. 18, below).

FOR THE ASSISTANT DIRECTOR, RESEARCH AND REPORTS:

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Chief, Publications Staff

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Economic Research Aid

INDEX OF PRODUCERS EQUIPMENT
FOR THE USSR
1955-61 AND 1965

CIA/RR A.ERA 61-9

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FOREWORD

A production index for producers equipment is developed in this research aid, which also includes brief comments on some of the problems involved in the construction and interpretation of such an index. Producers equipment is an important part of Soviet equipment produced for civilian use. An index covering production of all equipment for civilian use is being developed in another ORR project that will be published at a later date. This project will include a more complete discussion of the problems of constructing indexes as well as the problems of comparing indexes for Soviet industry constructed by ORR with the Federal Reserve index of US industrial production.

S-E-C-R-E-T

S-E-C-R-E-T

CONTENTS

	<u>Page</u>
Summary	1
I. Introduction	3
II. Computed Index	3
III. Comparison with Official Soviet Indexes	6

Appendixes

Appendix A. Methodology	11
Appendix B. Source References	33

Tables

1. Indexes of Production of Producers Equipment in the USSR, 1955-61 and 1965	4
2. Actual and Estimated Increases in Production of Producers Equipment, 1955-60 and 1960-65, and Ratio of Acceleration	7
3. Estimated Production of Industrial Equipment in the USSR, 1955-61 and 1965	18
4. Estimated Production of Nonindustrial Producers Equipment in the USSR, 1955-61 and 1965	20
5. Index of Producers Equipment for the USSR, 1955-61 and 1965	21
6. Estimated Production and Price Weights of Producers Equipment in the USSR, 1955-61 and 1965	22
7. Estimated Production and Price Weights of Metalcutting Machine Tools in the USSR, by Type, 1955-61 and 1965 . .	26
8. Estimated Production and Price Weights of Mainline Locomotives in the USSR, by Type and Model, 1955-61 and 1965 .	27

- v -

S-E-C-R-E-T

S-E-C-R-E-T

	<u>Page</u>
9. Estimated Production and Price Weights of Tractors in the USSR, by Model, 1955-61 and 1965	28
10. Estimated Production and Price Weights of Motor Vehicles, in the USSR, by Model, 1955-61 and 1965	29
11. Estimated Production and Price Weights of Excavators in the USSR, 1955-61 and 1965	32

S-E-C-R-E-T

S-E-C-R-E-T

INDEX OF PRODUCERS EQUIPMENT FOR THE USSR*
1955-61 AND 1965

Summary

An index of producers equipment for the USSR for 1955-61 and 1965, independent of the official Soviet gross production index for machine building, indicates an average annual rate of growth of producers equipment of 13.3 percent between 1955 and 1960. The annual rate for individual years declined throughout the period from 19 percent in 1956 to 14 percent in 1959.** The rate of increase during 1959-65 (the period of the Seven Year Plan) is estimated to be 11 percent. The most rapid increases were exhibited by the categories of civil communications and industrial equipment. The planned (or expected) increases in the Seven Year Plan period, among major categories, range from 165 percent for industrial equipment to 38 percent for transportation equipment.

Among the individual industries, industrial electronic equipment is expected to show the fastest rate of growth during the 10-year period covered in this research aid, increasing by 1,200 percent by 1965. The second highest index in 1965 is expected to be that of the civil aircraft industry -- 508. The civil aircraft industry, however, has not shown a sustained increase in production throughout the entire period since 1955. The index reached 847 in 1959 and declined to 424 in 1961.

The index developed in this research aid represents an attempt to estimate the growth of an important segment of the machine building industries -- the producers equipment industries. The index is based on price-weighted physical production of the categories of producers equipment that are reported in official sources. In addition, estimates of production of such important categories as nonmilitary electronic equipment, merchant shipbuilding, and civil aircraft are included.

The index developed in this research aid probably understates the real growth in the volume of production of producers equipment. In order to develop a series representing broad classes of equipment for which detailed production data on individual models were not available, it was necessary to use an estimated average price per physical unit for the

* The estimates and conclusions in this research aid represent the best judgment of this Office as of 15 September 1961.

** Percentages given in the text are derived from the tables in Appendix A rather than from the rounded numbers in the text.

S-E-C-R-E-T

S-E-C-R-E-T

entire class of equipment. This methodology does not allow any adjustment for the increasing complexity of equipment. Because increases in complexity generally represent increases in value, omission of the adjustment for complexity of equipment results in a downward bias in the computed index.

S-E-C-R-E-T

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I. Introduction

In order to construct an index of the changes in the real volume of Soviet production of producers equipment,* it would be necessary to have a series for producers equipment that is based on value-added weights. Data are not available for such a series. The index presented below is based primarily on price-weighted physical production series. Soviet production series reported in terms of value are used for a few product lines.

Physical production data are available in the statistical handbooks for most of the product lines. Estimates of production by model are available for some product lines that are produced serially. For other product lines, production data by model are poor or nonexistent. Physical production data for electronic equipment, civil aircraft, and merchant shipbuilding are not published in official handbooks. The physical production for these categories, as well as the valuations, therefore, has been estimated.

Some attempt has been made in the index to include production of spare parts although such data are extremely spotty. Estimates of spares are included for motor vehicles, tractors, and agricultural machinery. The data on civil aircraft include estimates of the value of initial spares. The data on merchant shipbuilding include estimates of the value of repair work on maritime vessels.

The data for the official value of production include production of spare parts and may in some cases include repair work on the fixed capital of the industries reporting production. The product lines for which official production series (in rubles) are used in the index developed in this research aid are as follows: chemical equipment for the entire period covered; instruments for the link between 1958, 1959, and 1960; and instruments, textile machinery, foundry equipment, and equipment for the food industry for the link between 1958 and 1965.

II. Computed Index

The computed index of producers equipment and indexes for major components are presented in Table 1.** The computed index indicates an

* Producers equipment is defined, for the purposes of this research aid, as all of the durable equipment that is used in the production process. Production is used here in the broad sense, including service activities such as transportation and communications as well as industrial production.

** Table 1 follows on p. 4.

S-E-C-R-E-T

S-E-C-R-E-T

Table 1

Indexes of Production of Producers Equipment in the USSR a/
1955-61 and 1965

Category	1955 = 100							
	1955	1956	1957	1958	1959	1960 b/	1961 b/	1965
All producers equipment	100	119	136	151	172	187	208	317
Industrial equipment (excluding nonelectronic instruments)	100	112	117	131	154	177	204	346
Machine tools c/	100	114	110	121	131	142	150	217
Metallurgical equipment	100	103	95	98	112	123	134	179
Mining equipment d/	100	115	133	158	163	N.A.	N.A.	N.A.
Petroleum equipment e/	100	101	123	143	156	189	N.A.	N.A.
Chemical equipment	100	103	123	138	216	275	344	736
Power equipment f/	100	111	121	138	164	192 g/	230 g/	364 g/
Industrial electronic equipment	100	150	175	225	275	350	450	1,300
Equipment for light industry h/	100	100	109	104	128	N.A.	N.A.	N.A.
Civil communications equipment	100	100	123	146	169	192	208	308
Construction equipment	100	112	136	152	144	166	205	341
Agricultural machinery and tractors	100	144	192	160	137	150	177	295
Transportation equipment	100	117	127	152	173	169	170	211
Motor vehicles	100	106	111	114	113	122	131	172
Civil aircraft	100	254	373	627	847	593	424	508
Merchant shipbuilding	100	136	137	158	195	195	204	238
Mainline railroad equipment	100	104	105	136	157	167	191	225

a. Data are from Tables 3, 4, and 5, Appendix A, pp. 18 through 21, below.

b. Preliminary and subject to revision.

c. Including metalcutting machine tools and metalforming machine tools.

d. Including coal combines, coal cutting machines, rock loading machines, and electric mine locomotives.

e. Including petroleum refining equipment, deep well pumps, and turbodrills.

f. Including turbines, steam boilers, turbogenerators, electric motors, power transformers, and electric bulbs.

g. The index for power equipment for 1960, 1961 and 1965 was assumed to be the same as for the combined index for turbines, turbogenerators, transformers, and electric motors, based on a link with 1959.

h. Including carding machines, spinning machines, reeling machines, circular hosiery automatics, industrial sewing machines, fleshing machines, tying machines, type-setting machines, and flat-bed printing machines.

- 4 -

S-E-C-R-E-T

S-E-C-R-E-T

increase in output of producers equipment of 87 percent during 1955-60. The increase during the Seven Year Plan (1959-65) is estimated to be 110 percent above production in 1958.

The estimated average annual rate of growth of production of producers equipment from 1955 to 1960 is approximately 13.3 percent. The annual rates of increase declined throughout the period, from 19 percent in 1956 to 8 percent in 1960. Estimates for 1965 indicate that the average annual increase in production of producers equipment during the Seven Year Plan will be approximately 11 percent.

Table 1 also shows indexes for producers equipment grouped by major consuming sectors of the economy. During 1956-60, among these functional categories, civil communications exhibited the most rapid rate of growth, 92 percent. In the same period, industrial equipment increased by 77 percent, transportation equipment by 69 percent, construction equipment by 66 percent, and agricultural machinery and tractors by 50 percent.

Production of civil aircraft increased at a greater rate than any other individual series during 1955-60. Production rose by 1959 to 847 percent of the 1955 level but declined in 1960 to 593 percent of the 1955 level. Production of industrial electronic equipment increased to 350 percent of the 1955 level and that of chemical equipment to 275 percent.

Indexes of estimated production in 1965 for individual industries and categories of equipment are given in the tabulation below:

	Index (1958 = 100)
All producers equipment	210
Industrial equipment	265
Industrial electronic equipment	578
Chemical equipment	535
Instruments*	297
Power equipment**	271
Foundry equipment	245
Textile equipment	220
Food processing equipment	220
Metallurgical equipment	182
Machine tools	178
Construction equipment	225
Civil communications equipment	211
Agricultural machinery and tractors	184
Transportation equipment	138
Mainline railroad equipment	165
Motor vehicles	150
Merchant shipbuilding	151
Civil aircraft	81

* Excluding industrial electronic equipment.

** Including turbines, turbogenerators, electric motors, and power transformers only.

S-E-C-R-E-T

S-E-C-R-E-T

By the end of the Seven Year Plan period the estimated production of producers equipment is expected to increase to 210 percent of production in 1958. Among the functional groups it is estimated that the category of industrial equipment will increase by a greater percentage than the other categories. The estimated 1965 index for that category is 265 (1958 = 100).

Within the category of industrial equipment, electronic, chemical, power, and foundry equipment are expected to grow fastest during the Seven Year Plan period. The index for industrial electronic equipment for 1965 is estimated at 578, which is considerably higher than that of any other individual category of equipment. The estimated 1965 index for chemical equipment is 535; for power equipment, 271; and for foundry equipment, 245.

The extremely high rate of growth already achieved or planned during 1955-65 in industrial electronic equipment reflects the importance of this equipment in the automation and mechanization programs of the USSR. The high rate of growth of chemical equipment also reflects a priority program in the expansion of the chemical industry. A widespread program of mechanization in the foundry industry is being undertaken to support the machine building industry.

A comparison of the actual growth during 1955-60 with the planned or expected growth during 1960-65 indicates the degree of shifts in emphasis on various categories of producers equipment. Most data in the sample show either rather sharp acceleration or deceleration in the planned or anticipated growth between 1960 and 1965 compared with the actual growth achieved between 1955 and 1960. The changes for the periods 1955-60 and 1960-65, as well as a ratio of acceleration, are shown in Table 2.*

There is no close correlation between the increase expected for 1960-65 and the ratio of acceleration. For example, the category showing the highest index of acceleration, metallurgical equipment, ranked substantially below industrial electronic equipment in the planned increase between 1960 and 1965.

III. Comparison with Official Soviet Indexes

The USSR does not publish an index of production of producers equipment. Producers equipment is, however, a major component of the official index of gross production of the machine building industry. That index also includes durable consumer goods and military hardware. There is no known official index of gross production of producers equipment, although such an index might deviate substantially from that developed in

* Table 2 follows on p. 7.

S-E-C-R-E-T

S-E-C-R-E-T

Table 2

Actual and Estimated Increases in Production of Producers Equipment,
1955-60 and 1960-65, and Ratio of Acceleration

Category	(1) Actual Percentage Increases 1955-60 a/ 1955-60 a/	(2) Estimated Percentage Increases 1960-65 a/ 1960-65 a/	(3) Ratio of Acceleration b/ of Acceleration b/
Metallurgical equipment	23	46	1.00
Agricultural machinery and tractors	50	97	0.94
Motor vehicles	22	41	0.86
Construction equipment	66	105	0.59
Machine tools	42	53	0.26
Industrial electronic equipment	250	271	0.08
Power equipment	92	90	-0.02
Chemical equipment	175	168	-0.04
All producers equipment	87	70	-0.20
Civil communications equipment	92	60	-0.35
Mainline railroad equipment	67	35	-0.48
Merchant shipbuilding	95	22	-0.77
Civil aircraft	493	-14	-1.03

a. Data are from Table 1, p. 4, above. Data for 1960 are preliminary and subject to revision.

b. Derived as follows: $\frac{\text{Column (2)} - \text{Column (1)}}{\text{Column (1)}}$. A ratio of zero would indicate no acceleration in the rate of growth of the series between the two periods. A negative ratio indicates a deceleration in the rate of growth of the series, and a negative ratio in excess of -1.00 indicates an absolute decline in the series.

- 7 -

S-E-C-R-E-T

S-E-C-R-E-T

this research aid because of methodology differences. Knowledge of the Soviet methodology gives an indication of differences that could be expected.

By its very nature an index of gross production does not necessarily reflect solely real changes in production. Because the official Soviet indexes are price-weighted aggregates of gross production at the enterprise level, there is considerable multiple counting. Changes in the organizational structure of an industry result in changes in the degree of multiple counting and, therefore, in the movement of the index of gross production from one reporting period to the next. Whereas the indexes of gross production include too much data, the computed index in this research aid is weak in that it does not include enough. The computed index is limited to those categories of producers equipment for which production data are published in Soviet sources or for which estimates of production can be constructed. An index of gross production, because it would be based on comprehensive coverage, would include many rapidly growing types of producers equipment that are not included in the index computed for this research aid. It is likely, therefore, that an index of gross production would show a faster rate of increase for recent years than the computed index.

An index that is most comparable to the computed index of producers equipment is that for the equipment component of fixed capital investment. The coverage of the two indexes is conceptually similar. Furthermore, the data on investment represent a price-weighted aggregate with multiple counting eliminated. A recent estimate of the equipment component of investment in the USSR is available. ¹/* An index of the equipment component has been constructed and is compared with the computed index of producers equipment in the tabulation below:

	Index (1955 = 100)			
	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>1959</u>
Computed index of producers equipment	119	136	151	172
Index of the equipment component of investment	124	137	154	177

* For serially numbered source references, see Appendix B.

S-E-C-R-E-T

S-E-C-R-E-T

It is probable that the index of investment would tend to run somewhat higher than the index of production if the series were extended to include later years, for the investment data probably include more of the newer, fast-growing types of equipment than were available for construction of the index of production.

The computed index probably understates the real growth in the volume of production of producers equipment. For those categories that represent broad classes of equipment for which detailed data for each model produced are not available, it was necessary to estimate an average price per physical unit that would cover the entire class of equipment. It is reasonable to assume that for most such broad classes of equipment the complexity of the products is increasing and that the increase in complexity represents an increase in value. Such categories account for a large proportion of the estimated downward bias in the index of producers equipment. Examples of such categories are those for metallurgical equipment and petroleum refining equipment, production of which is reported in metric tons. Similar biases also can be expected in categories for such equipment as metalcutting machine tools, production of which is reported in physical units for various types. Because production by model is not available, it was necessary to assign a price to represent each general type. This price was used for weighting production of that type of equipment for the entire period covered in this research aid with adjustment for changes in complexity of the equipment.

S-E-C-R-E-T